NASA AMES RESEARCH CENTER
INFORMATION SCIENCES AND TECHNOLOGY

DESTINATION: MARS

MARS EXPLORATION ROVER MISSION

HUMAN-COMPUTER INTERACTION

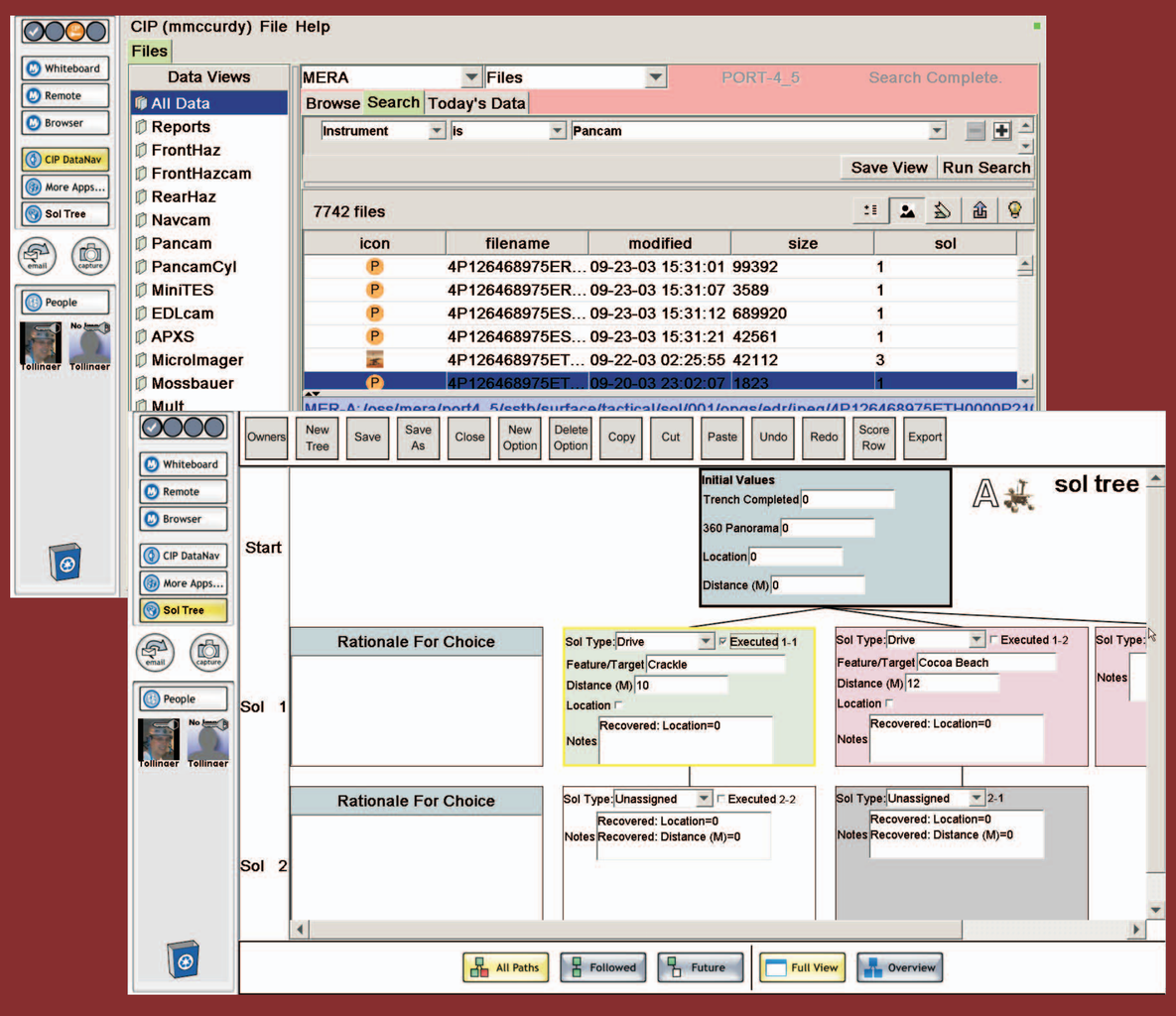
Designing Usable Tools for Mission Scientists and Engineers

Due to the communications limitations between Earth and Mars, the daily science discovery and planning process for the Mars Exploration Rovers (MER) Mission needs to be done quickly. The mission science and engineering teams have 18 earth hours to analyze the data received, use the analysis in deciding the science plan for the following day, and encode the science activities as a sequence of commands for transmission to the rover.

The lead scientist for the day then works with a mission engineer to make sure the scientists' goals for the day are clearly represented before proceeding to build the daily activity plan to be sent to the Rover. In order to help scientists with the hundreds of daily scheduling constraints, Human Factors researchers have developed the Constraint Editor, a tool designed to support the efficient and accurate capture of scientific intent through the process of sending commands up to the rovers.

Working with Constraint Editor in the Science Analysis room at JPL.

Collaborative Information Portal's interface for capturing data.



Long-term planning with the Sol-Tree Tool on the MERBoard.

Human-Computer Interaction (HCI) designers help create software tools that are usable, consistent, learnable, and efficient while also being less prone to error. For the MER Mission, the HCI team worked with lead mission scientists and engineers to design the mission critical Constraint Editor, and contributed to the design of other tools including:

- **MERBoard, a large-screen, collaborative workspace.**
- **MERCIP (Collaborative Information Portal), a resource for mission information.**
- **VIZ a 3D visualization tool.**

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http://hci.arc.nasa.gov

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